

*AmComm 5225*

**S 2 25**

**OWNERS MANUAL  
SCHEMATIC  
WARRANTY**

OUR S 2 25 TRANSCEIVER INCORPORATES THE LATEST A3 MOD - SEE ATTACHED SCHEMATIC



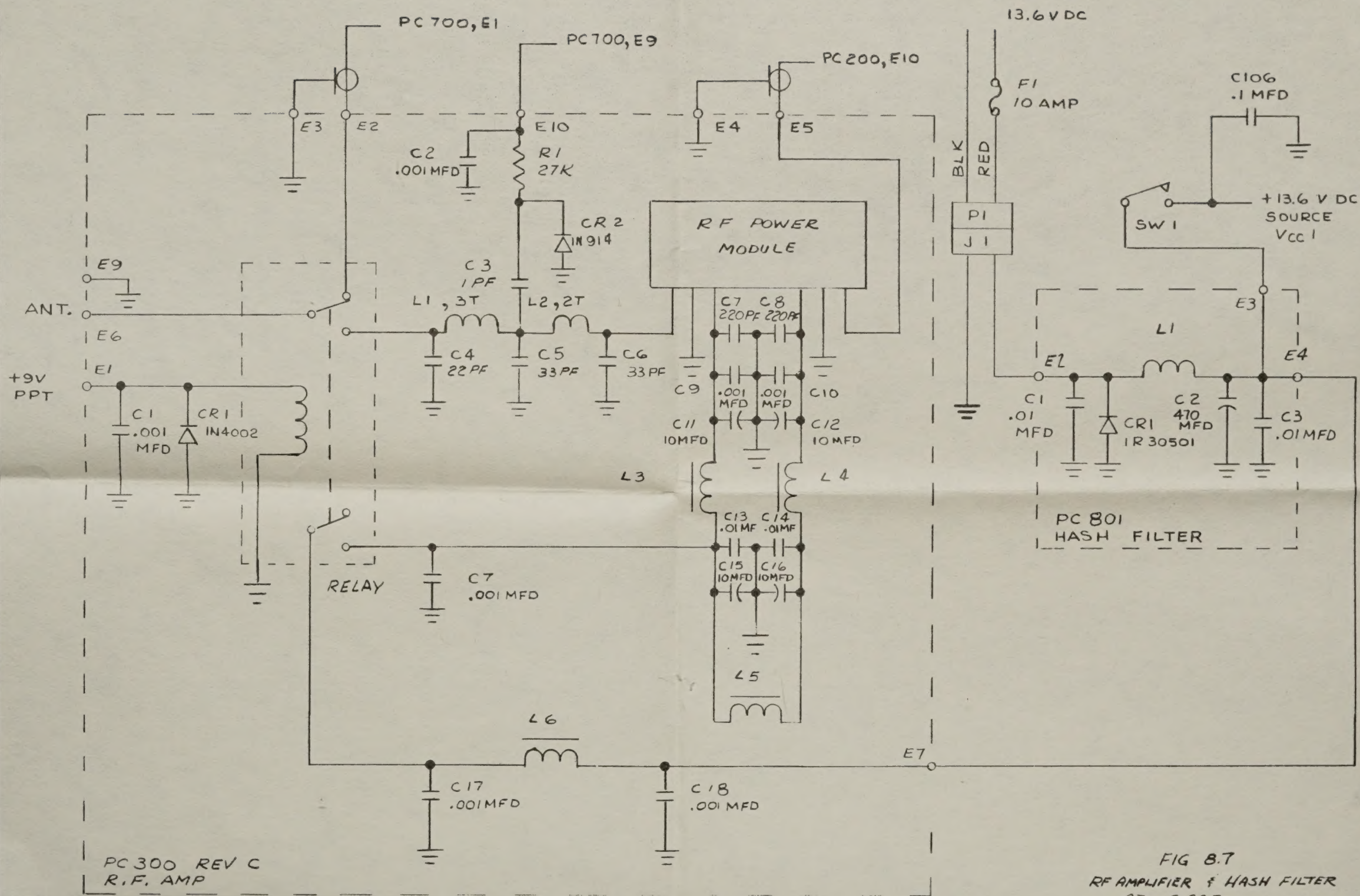


FIG 8.7  
RF AMPLIFIER & HASH FILTER  
A3 S-225





# AMCOMM

## Touch Tone Encoders — Models TTE-100 and TTE-200

### Description:

The Amcomm Touch Tone Encoders are designed specifically for use with FM Transceivers to allow telephone access through fixed station repeaters. The encoder generates the standard telephone tones according to the numbered push buttons on the Encoder. The Model TTE-100 is designed specifically for use with the Amcomm S 2 25, 2 meter transceiver, but can also be used on other equipment provided that a +9 volt DC regulated source at 70 ma is available. The Model TTE-200 incorporates its own regulator allowing operation from a +11.0 to +14.0 volt DC source at 70 ma.

Both models provide a switched ground connection for automatic key up of the transmitter when using the touch tone buttons. A delay circuit holds the key up signal for one second after any button is actuated, holding the transmitter on between digits when dialing.

Access to the tone output level control is provided on the back of the unit. This allows adjustment of the deviation of the transmitter according to the user's requirements.

### SPECIFICATIONS

Input Power Requirements	— TTE 100 +9 volts DC regulated at 70 ma TTE 200 +11.0 to +14.0 volts DC at 70 ma
Tone Output Level	— Adjustable to 1.0 volts RMS maximum into 600 ohms
Auto Transmit	— Switched ground with 1 second delay after button release
Size	— 2" x 2 $\frac{3}{4}$ " x 1" high
Mounting	— Standard microphone button and clip provided
Cable	— 4 wire cable 4' long included for connection to transceiver
Connections	— Green: ground Orange: +9 volts DC for the TTE-100 +11.0 to +14.0 volts DC for the TTE-200 Blue: Remote xmit Purple: Tone output









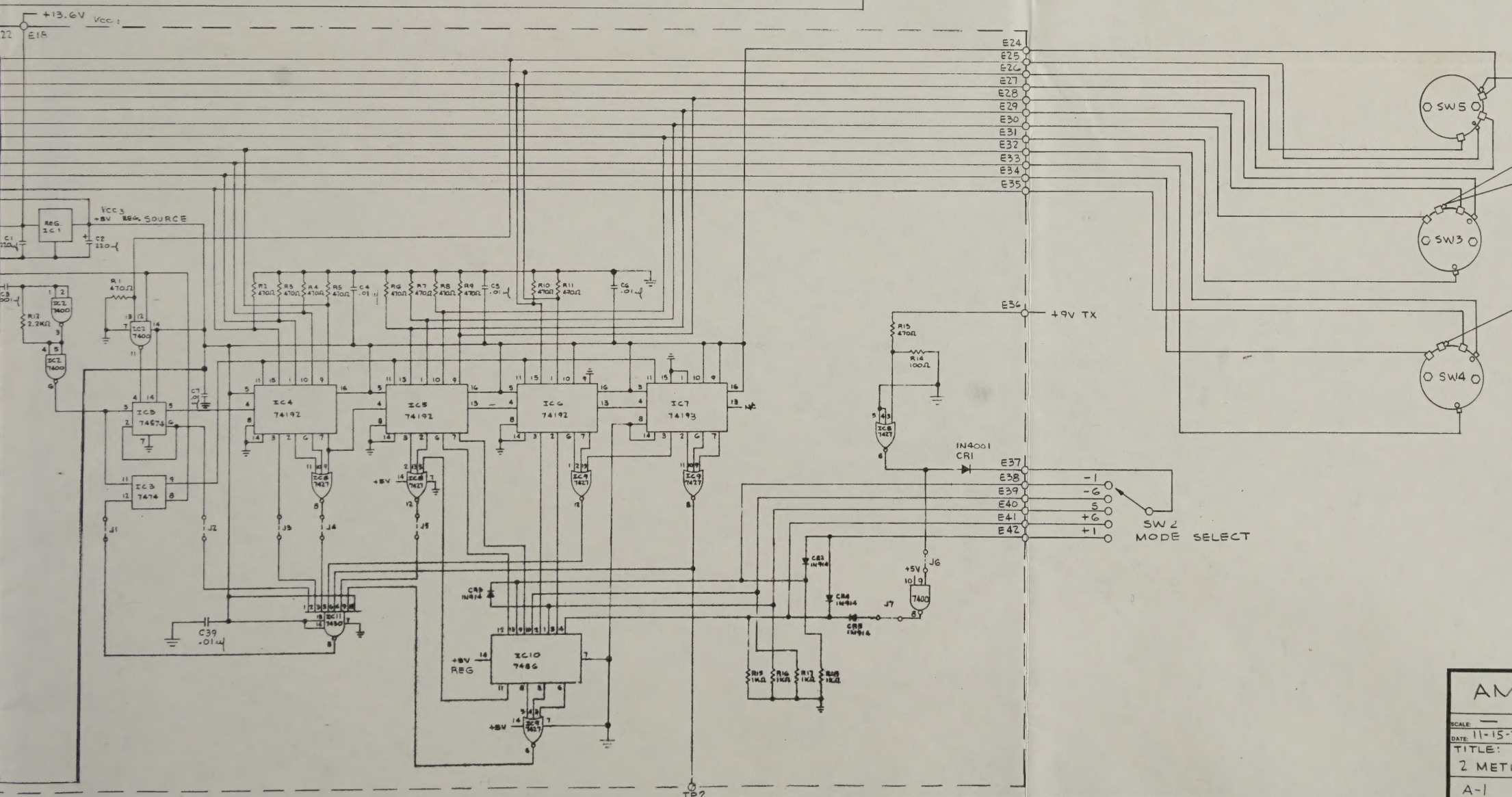
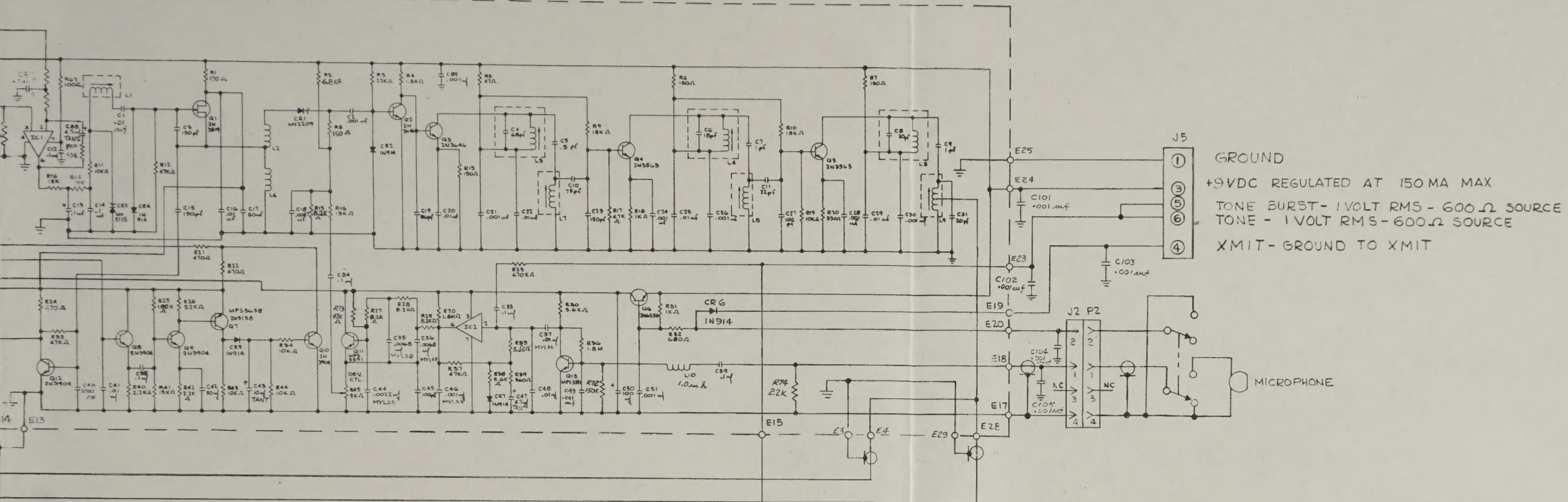








REV	DESCRIPTION	APPROV.
A	RELEASED E.H. DEC 76	645
B	REVISED PER DCN 133 E.H. FEB 77	645



AMCOMM		APPROVED BY:
SCALE: 1:1	DATE: 11-15-76	645
TITLE: SCHEMATIC 2 METER TRANSCEIVER		REVISOR: E. HUBERT
A-1		MODEL: S-225
		DRAWING NUMBER: J4600001





# OWNER'S MANUAL

## AMCOMM

## S 2 25







# **S 2 25**

# **OWNER'S**

# **MANUAL**

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## SPECIFICATIONS

### GENERAL:

Frequency Coverage  
Number of Semiconductor  
Devices

Modulation Type  
Power Requirement  
Current Drain

Antenna Input  
Dimensions (Physical)  
Weight

144.000 MHz to 147.995 MHz  
36 Transistors  
31 I.C.'s  
8 LED's  
16F3  
13.6 volts D.C.  
Transmit: 7  
Receive: 1.4 amps.\*  
\*Maximum Display Brilliance  
50 OHMS Unbalanced  
7 $\frac{1}{8}$ " W x 2 $\frac{5}{8}$ " H x 10" D  
4 $\frac{1}{2}$  lbs.

## SPECIFICATIONS

### TRANSMITTER:

Frequency Coverage:

Frequency Control:  
Modulation System:  
Microphone:  
R.F. Power Output

Frequency Stability:  
Audio Frequency Response:

Frequency Display:

144.000 MHz to 147.995 MHz  
In 5 KHz Steps  
800 Channels

Digitally Synthesized  
Phase Modulation  
Low Impedance  
25 Watts nominal  
Variable approximately from 1 through  
25 watts  
Within  $\pm .001\%$  from  $-20^{\circ}\text{C}$  to  $+60^{\circ}\text{C}$   
 $+2\text{db}$  to  $-8\text{db}$  from the standard  $6\text{db}$   
per octave de-emphasis from 300 Hz to  
3000 Hz  
6 Digit, 7 Segment LED

## SPECIFICATIONS

### RECEIVER:

Frequency Coverage:

Frequency Control System:  
Intermediate Frequency  
Sensitivity (usable)

Modulation Acceptance  
Bandwidth  
Local Oscillator Frequency  
Stability:  
Audio Output Power

143.000 MHz to 148.995 MHz  
Simplex: 800 Channels with 5 KHz separation  
Duplex:  $+600\text{ KHz}$   $-600\text{ KHz}$   
or  $+1\text{ MHz}$  and  $-1\text{ MHz}$  for each channel  
Digital Synthesized  
21.4 MHz  
.35 microvolt, 12 db Sinad @ 50% Audio  
.5 microvolt for 20 db quieting  
 $\pm 7.5\text{ KHz}$  Minimum  
 $\pm 10$  parts per million  
4 Watts into a 4 ohm load @  
less than 10% distortion

# GENERAL DESCRIPTION AND FEATURES

## A. FREQUENCY COVERAGE

Transmit 144.000 to 147.995 MHz in 5 KHz steps.

Receive 143.000 to 148.995 MHz in 5 KHz steps.

## B. SPLIT OPERATION

By use of the REC'R OFFSET switch on the front panel, the receiver frequency may be offset from the transmit frequency. The transmit frequency is displayed by the 7 segment LED display and the receiver frequency differs by the amount shown on the REC'R OFFSET switch (+1 MHz, +.6 MHz, Simplex, -.6 MHz, -1 MHz). This allows the S 2 25 to work almost all repeaters now in use. If an unusual split is required, please consult the factory.

## C. 7 SEGMENT LED FREQUENCY DISPLAY

This display shows the transmitting frequency. It also shows when the transmitter is keyed (TX) and that the synthesizer is locked on to a frequency (LK). The brightness of this display and of the meter are regulated by the DIM control to provide the most convenient intensity for use at night or in bright sunlight.

## D. FREQUENCY SELECTION

Three switches control the frequency selection. The 100 KHz steps are controlled by the center knob and the 10 KHz steps are controlled by the right hand knob. The left hand knob controls both, 1 MHz steps and 5 KHz steps. There are two positions for each MHz setting, one which will give a 0 in the KHz display and one which will show 5 KHz.

## E. RECEIVER

The antenna is coupled into a 3 section low pass filter which reduces unwanted signals from commercial transmitters and other stations. The tuned RF amplifier incorporates a FET for maximum signal to noise characteristics and feeds the signal to a dual gate mosfet mixer. The resultant 21.4 IF is connected to an 8 pole crystal filter with extremely sharp selectivity. The signal is amplified and then detected by a 2 pole crystal discriminator. The final audio amplifier develops 4 watts of output. See block diagram for signal path.

## F. R.F. POWER MODULE

A broadband power amplifier delivers a clean signal to the 3 section filter. This module requires no tuning and is designed for ruggedness and durability.

## G. VARIABLE TRANSMIT POWER

Output power may be varied between approximately 1 watt through 25 watts from the front panel. When communicating with nearby stations, the lower power output setting may be used to minimize interference to other stations.

## H. TOUCH TONE CONNECTION

There is a prewired plug on the back of the set which will take the AMCOMM Touch Tone encoder.

## I. CONSTRUCTION

The S 2 25 circuitry is designed and constructed on G-10 fiberglass printed circuit board material, for a most reliable foundation. All circuit boards are mounted on chassis standoffs for maximum mechanical stability. The entire mechanical chassis is aluminum, including the cover and front panel for superb durability.



## INSTALLATION:

Upon receipt of your transceiver, carefully examine it for any signs of damage. Should any damage be apparent, notify the delivering carrier or dealer immediately, stating the full extent of the damage. Amcomm recommends that you keep the shipping carton. In the event storage, moving or re-shipment becomes necessary, they come in handy.

For use in mobile applications, locate your transceiver in the most accessible position for safety and driving convenience. Since the S 2 25 is compact, many mobile mounting possibilities present themselves. In general, the mobile mounting bracket will provide you with some guide as to placement. For fixed station use, an 8 Amp., 13.6 volt regulated power supply is necessary for satisfactory operation. In mobile service a 12 volt negative ground source is required.

Some note must be taken, however, to the condition of the vehicle's electrical system. Items such as a low battery, worn generator/alternator, poor voltage regulator, etc., will impair operation of your transceiver. When high noise generation or low voltage occur, these may be traced to vehicle deficiencies within the electrical system. It is very important to have the correct regulated voltage present at all times in transmit or receive functions.

### CAUTION:

EXCESSIVE VOLTAGE (ABOVE 15 VOLTS) MAY CAUSE DAMAGE TO YOUR TRANSCEIVER. BE SURE TO CHECK THE SOURCE VOLTAGE AND POLARITY BEFORE PLUGGING IN THE POWER CORD.

Included with your transceiver is a power cable with a fuse and a polarized plug. This plug can only be installed one way. The red wire is (+) positive, the black wire is (–) negative. The most satisfactory installation is to connect these wires directly to the battery terminals. Use at least a 14 gauge wire (observe polarity). This type of mobile installation permits the least amount of noise and transient spikes, sometimes found in automotive accessory wiring. If such an arrangement is not possible; then, connect the red fuse lead from the S 2 25 to a convenient +12 volt lead in the interior of the vehicle. Connect the black lead from the S 2 25 to a convenient ground in the interior of the vehicle. (Any metal frame in the vehicle constitutes a convenient ground.)

Please be certain that if an interior connection is used, that 13.6 volts at 8 amps is available without over-loading the internal electrical system.

When using the S 2 25 in base usage, observe proper wiring polarity to the DC power supply. The DC power supply must be capable of 13.6 volts at 8 amps. regulated to insure reliable base station operation.

**WARNING:** DO NOT CONNECT TO UNREGULATED OR POWER SUPPLY WITH LESS THAN 8 AMP. CAPABILITY AS DAMAGE TO POWER OUTPUT AMPLIFIER MAY RESULT.

## **ANTENNA:**

The most important single item that will enhance the performance of the S 2 25, is the antenna. For that reason, a high quality, high gain antenna of 50 ohms impedance is recommended for either mobile or fixed base station use. **DO NOT USE A C.B. ANTENNA FOR ANY REASON. A 27 MHz C.B. ANTENNA APPEARS AS A DEAD SHORT TO A 2 METER (146 MHz) RADIO. THEY MAY LOOK SIMILAR, BUT THEY ARE NOT SIMILAR ELECTRICALLY.**

In VHF, as well as the low bands, every watt of **EFFECTIVE RADIATED POWER** makes some difference. Therefore, 25 watts average output from the S 2 25 plus a 3 db gain antenna equals 50 watts ERP, presuming low VSWR. The few more dollars invested in a high quality gain type antenna will insure reliable communication.

By using a broad band amplifier in the transmit output stage, a high degree of safety is built-in. There is no tuning and with short circuit protection designed in, you will experience many hours of fine VHF two meter operation.

AMCOMM has included a high quality low impedance microphone (manufactured for us by Turner). The S 2 25 transceiver has been carefully designed and engineered to operate extremely well with this fine microphone. No additional pre-amplification is necessary or desirable.

## **TOUCH TONE PLUG:**

This keyed socket is for the AMCOMM Touch Tone Encoder. By plugging the tone pad into the socket, you have complete tone generation to access various autopatch equipped repeaters. Autopatch repeaters are only used by members of the local repeater club. Check with your local repeater club to obtain necessary access information.

# **CONTROL FUNCTIONS**

## **1. VOLUME:**

The volume control is used to adjust the audio output. The on/off switch is also on this control.

## **2. POWER:**

This control regulates the transmitter output power from approximately 1 watt to 25 watts. The highest power setting is in the full CW position.

## **3. SQUELCH:**

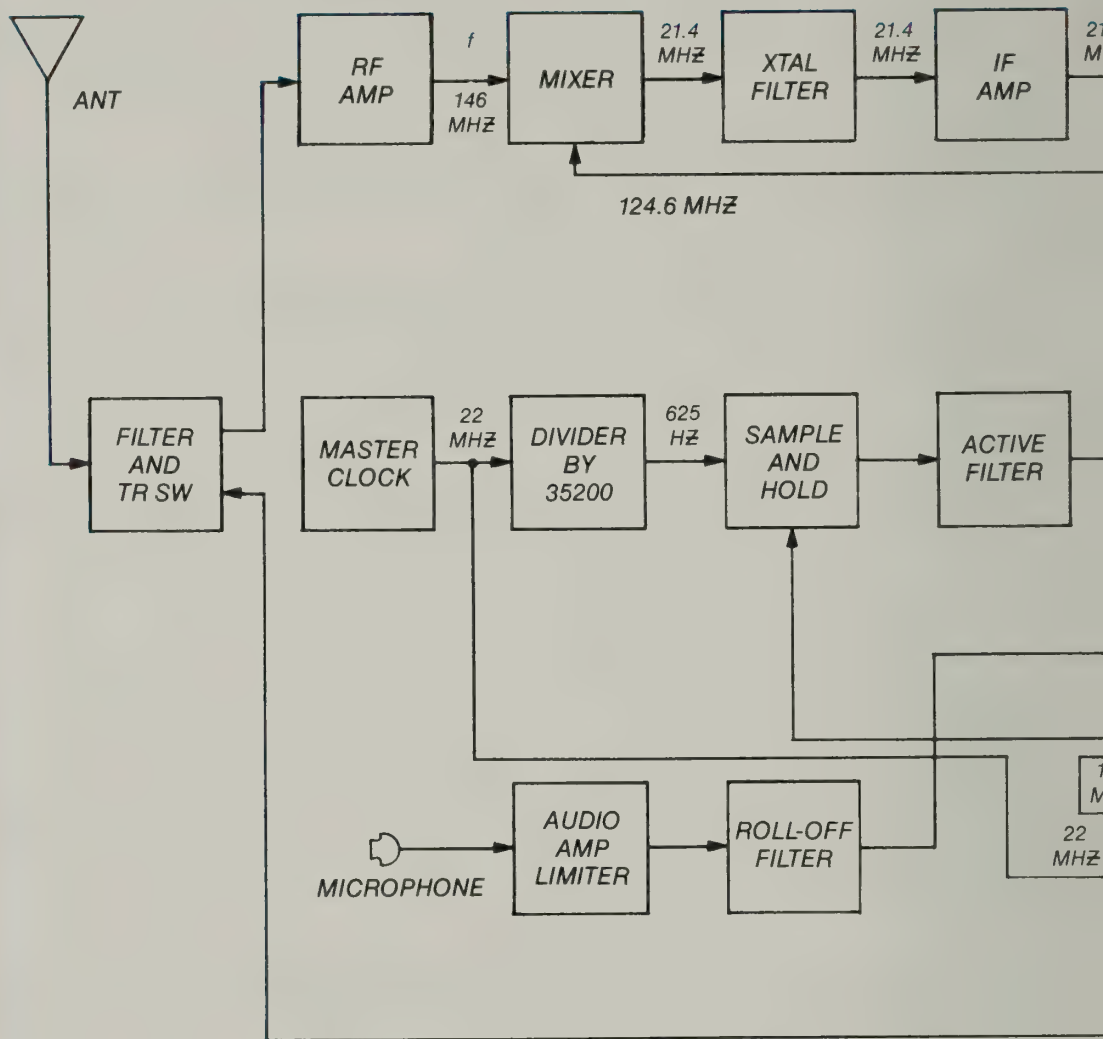
The squelch control is used to remove the background noise when no signal is present. CW rotation increases the necessary signal strength to open the squelch.

## **4. DIM:**

Rotation of this control CW increases the brightness of the frequency display and the meter light.

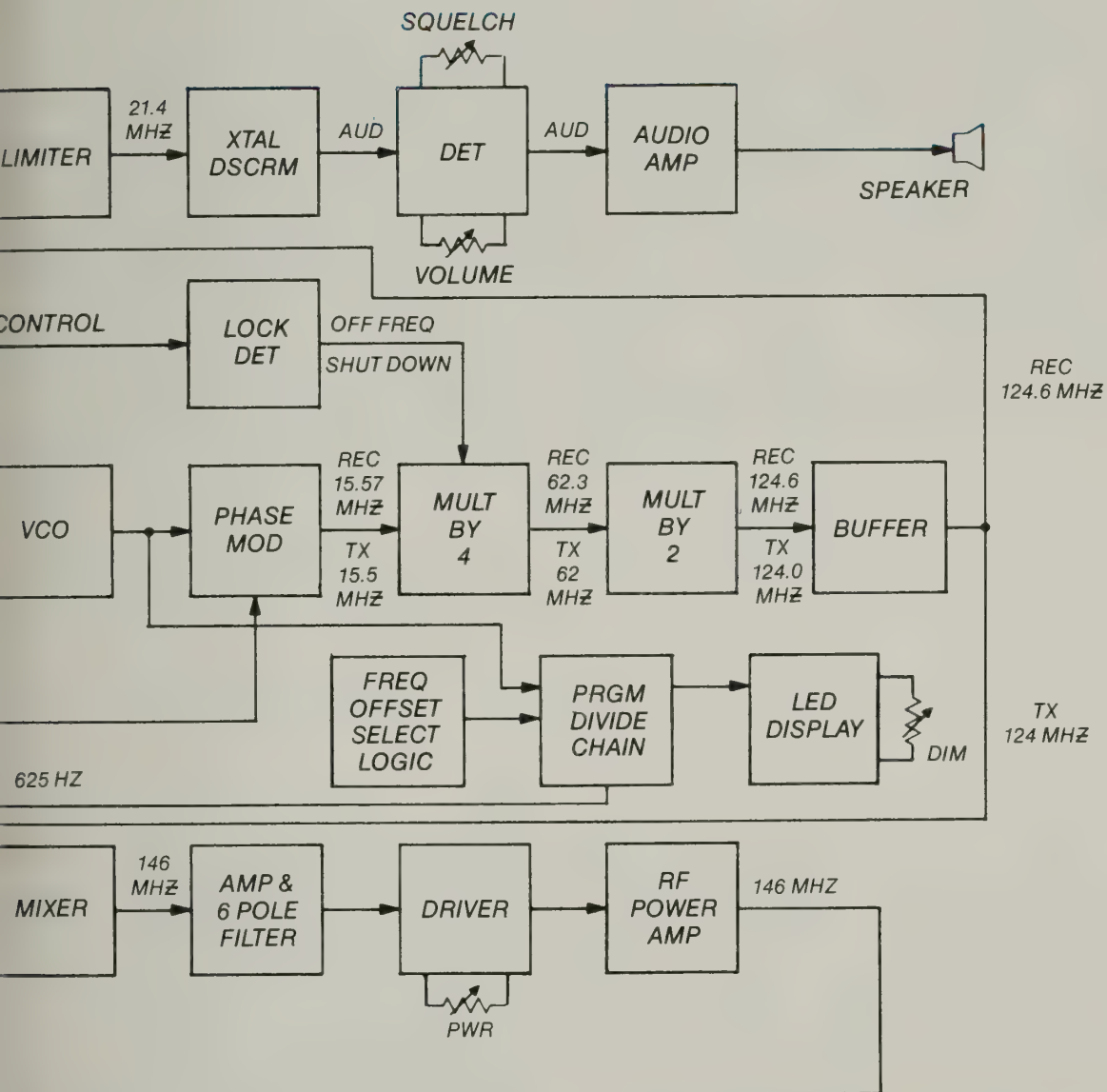
## **5. REC'R OFFSET**

This switch controls the offset of the receiver frequency from the transmitter frequency. The numbers around the control are in MHz with the "S" representing simplex (transmitter and receiver on the same frequency).



NOTE  
EXAMPLE FREQ: 146 MHZ ON SIMPLEX OPERATION





AMCOMM 730 W. McNAB RD., FT. LAUD., FLA.		
SCALE	APPROVED BY	DRAWN BY HUBERT
DATE DEC. 76		REVISED
2 METER TRANSCEIVER		
MODEL S 2 25		REVISION C1055H

## **6. FREQUENCY CONTROLS: (3 Knobs):**

These controls set the operating frequency of the transmitter.

**6A.** The first control regulates the MHz position (144, 145, 146 and 147) and the KHz position (0 KHz, 5 KHz). There are two positions for each MHz setting, one which will show 5 KHz and the other will show 0 KHz.

**6B.** The next control sets the 100 KHz setting (0-900 KHz).

**6C.** The last control sets the 10 KHz setting (0-90 KHz).

## **7. FREQUENCY DISPLAY:**

This display shows the transmitter frequency in MHz and is changed by the three frequency control knobs. The receiver frequency is this frequency plus or minus the value set by the mode switch.

## **8. LOCK LIGHT:**

This light is located at the extreme right of the frequency display window and is denoted by the word "LC." When it is lit, the synthesizer is locked on to the desired frequency and is stable. When changing frequency between transmit and receive, the light may blink showing that the synthesizer has moved to the new frequency.

## **9. TRANSMIT LIGHT:**

The light is located at the extreme right of the frequency display window and is denoted by the word "TX." It lights when the transmitter is turned on and shows that a signal is being transmitted.

## **10. METER:**

On receive, the meter shows the incoming signal strength. On transmit, it shows the transmitted power.

## **11. MIKE CONNECTOR:**

The microphone supplied with the set is attached here. The set is designed to use a 2000 ohm dynamic mike.

## **12. EXTERNAL SPEAKER JACK:**

This jack is used when an external speaker is desired. Use of an external speaker automatically disconnects the internal speaker.

## **13. TOUCH TONE ENCODER:**

The optional touch tone pad may be connected here.

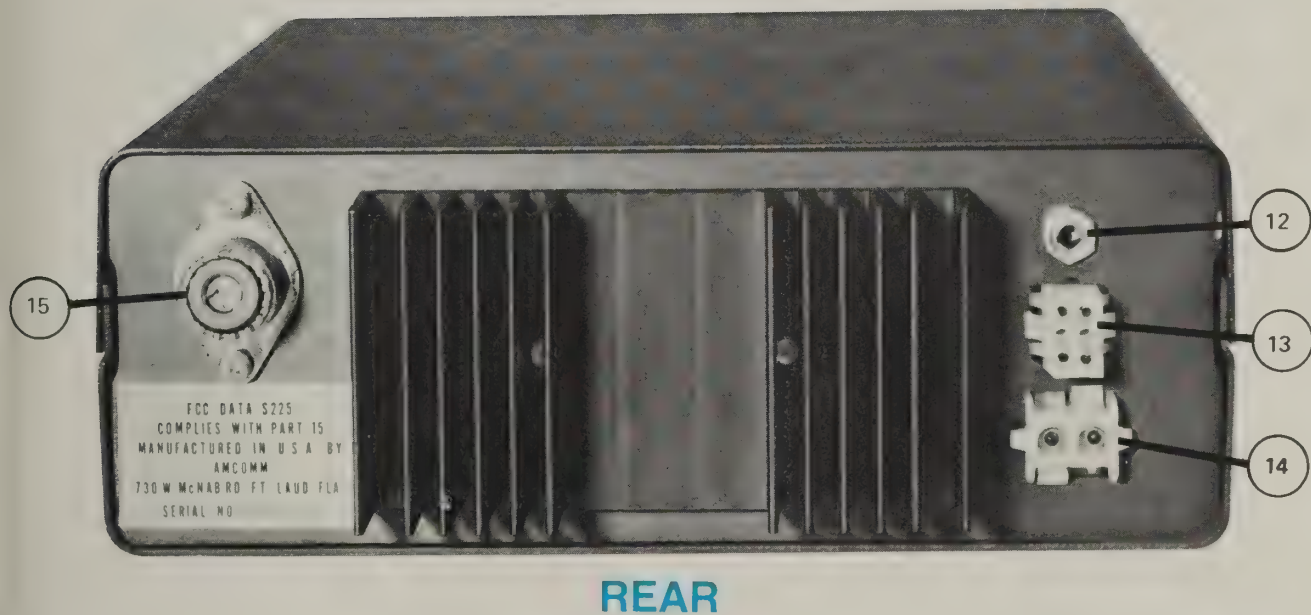
## **14. POWER PLUG:**

The power plug is polarized to prevent damage to the S 2 25 after the power cable has been correctly connected to the voltage source. (See section "Installation")

## **15. ANTENNA:**

The antenna connector requires a PL 259. A 50 ohm 2 meter antenna is connected here.

## S 2 25 CONTROLS





## THEORY OF OPERATION

The S 2 25 Transceiver incorporates state of the art integrated circuitry to insure maximum reliability and years of trouble free service. The heart of the unit is a single crystal controlled synthesizer which assures maximum frequency stability on both receive and transmit. The receiver uses a standard single conversion superheterodyne design and crystal filtering for optimum selectivity and sensitivity. The transmitter features a solid state power output module pretuned to the 2 meter band.

The transmitter is energized by the "Push to Talk" button on the microphone. The audio from the microphone is processed, filtered, amplified and applied to the phase modulator which varies the frequency from the VCO and generates the frequency modulated output signal.

When transmitting at 146 MHz the VCO operates at 15.5 MHz and is locked on frequency by the synthesizer. The VCO output is multiplied 8 times to 124 MHz and mixed with the crystal frequency of 22 MHz to produce the operating frequency of 146 MHz. The signal is amplified and filtered by the 6 pole broad band amplifier and drives the power amplifier to full power output. The output signal passes through the low pass filter to attenuate the spurious and harmonic energy and is then radiated by the antenna.

In the receiver the signal path from the antenna to the loud speaker is as follows. With the receiver tuned to 146 MHz the signal is captured by the antenna, fed through the low pass filter, amplified by the band pass R.F. amplifier and mixed with the local oscillator at 124.6 MHz to produce the I.F. frequency of 21.4 MHz. The I.F. signal is filtered through an 8 pole monolithic crystal filter for optimum selectivity. The I.F. signal is then amplified, limited and passed through a crystal quadrature detector. The resulting audio is fed through a squelch circuit, audio preamplifier, audio power amplifier and then to the loud speaker. An "S" meter is provided for relative signal strength.

A unique, advanced design, single crystal controlled synthesizer is used for all frequency control functions, producing in 5 KHz increments the transmitter exciting frequency and the receiver local oscillator signal when in simplex operation. For duplex operation, and depending upon the setting of the Rec'r Offset Switch, the synthesizer produces the necessary offsets in local oscillator frequency to allow reception at either  $\pm 600$  KHz or  $\pm 1$  MHz from the transmitted frequency.

The master clock crystal oscillator at 22 MHz is divided by 35,200 to produce a 625 Hz reference frequency. The programmable divide chain controlled by the frequency offset and frequency select logic divides the frequency from the voltage controlled oscillator. This is compared in the sample and hold circuit and a control voltage is generated. This control voltage keeps the VCO on the proper frequency. A lock detector is provided for off frequency shut down.

The VCO output is fed into the multipliers where the frequency is multiplied by 8. The result is used by the receiver as the local oscillator frequency or is combined with the 22 MHz clock to provide the transmitter frequency.

## ALIGNMENT

The S 2 25 is a complex broad band transceiver. Except for transmitter deviation, NO ADJUSTMENTS SHOULD BE MADE WITHOUT PROPER EQUIPMENT AND KNOWLEDGE. Due to the broad band design, any improper adjustment of the multiplier or R.F. predriver will result in desensitizing the receiver, "birdies," or unwanted harmonics. The only way to properly align the radio incorporates the use of a spectrum analyzer.

The S 2 25 is factory adjusted for a deviation of  $\pm 5$  KHz at 100% modulation which is compatible with most amateur repeater stations. The thumbwheel control to adjust deviation is located approximately in the center of the printed circuit board (PC-200) nearest the front panel on the top side of the chassis. Turning the control clockwise when viewing the radio from the front decreases the deviation; conversely, turning it counterclockwise increases the deviation. Access to this control is gained by removing the two #4 screws on each side of the unit and the top cover.

If further information is desired on maintenance and alignment of the radio, please write to the factory:

A complete maintenance handbook is available for the S 2 25 at a nominal charge.

**AMCOMM**

730 West McNab Road  
Fort Lauderdale, Florida 33309









730 WEST McNAB FORT LAUDERDALE, FLORIDA 33309

# OWNER'S MANUAL

## AMCOMM

### S-2 25







## **S 2 25 OWNER'S MANUAL**

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7. ALIGNMENT
8. GENERAL SCHEMATIC

## SPECIFICATIONS

### GENERAL:

Frequency Coverage	144.000 MHz to 147.995 MHz
Number of Semiconductor Devices	36 Transistors 31 I.C.'s 8 LED's
Modulation Type	16F3
Power Requirement	13.6 volts D.C.
Current Drain	Transmit: 6.5 amps.* Receive: 1.4 amps.* *Maximum Display Brilliance
Antenna Input	50 OHMS Unbalanced
Dimensions (Physical)	7-1/8"W x 2-5/8"H x 10"D
Weight	4-1/2 lbs.

## SPECIFICATIONS

### TRANSMITTER:

Frequency Coverage:	144.000 MHz to 147.995 MHz In 5 KHz Steps 800 Channels
Frequency Control:	Digitally Synthesized
Modulation System:	Phase Modulation
Microphone:	Low Impedance
R.F. Power Output	25 Watts maximum Variable approximately from 1 through 25 watts
Frequency Stability:	Within $\pm .001\%$ from $-20^{\circ}\text{C}$ to $+60^{\circ}\text{C}$
Audio Frequency Response:	+2db to -8db from the standard 6db per octave de-emphasis from 300 Hz to 3000 Hz
Frequency Display:	6 Digit, 7 Segment LED

## SPECIFICATIONS

### RECEIVER:

Frequency Coverage:	143.000 MHz to 148.995 MHz Simplex: 800 Channels with 5 KHz separation Duplex: +600 KHz - 600 KHz or +1 MHz and -1MHz for each channel
Frequency Control System:	Digital Synthesized
Intermediate Frequency	21.4 MHz
Sensitivity (usable)	.35 microvolt, 12 db Sinad @ 50% Audio .5 microvolt minimum for 20 db
Modulation Acceptance Bandwidth	$\pm 7.5$ KHz Minimum
Local Oscillator Frequency Stability:	$\pm 10$ parts per million
Audio Output Power	4 Watts into a 4 ohm load @ less than 10% distortion



## GENERAL DESCRIPTION AND FEATURES

### A. FREQUENCY COVERAGE

Transmit 144.000 to 147.995 MHz in 5 KHz steps.

Receive 143.000 to 148.955 MHz in 5 KHz steps.

### B. SPLIT OPERATION

By use of the MODE switch on the front panel, the receiver frequency may be offset from the transmit frequency. The transmit frequency is displayed by the 7 segment LED display and the receiver frequency differs by the amount shown on the MODE switch (+1 MHz, +.6 MHz, Simplex, -.6 MHz, -1 MHz). This allows the S 2 25 to work almost all repeaters now in use. If an unusual split is required, please consult the factory.

### C. 7 SEGMENT LED FREQUENCY DISPLAY

This display shows the transmitting frequency. It also shows when the transmitter is keyed (TX) and that the synthesizer is locked on to a frequency (LK). The brightness of this display and of the meter are regulated by the DIM control to provide the most convenient intensity for use at night or in bright sunlight.

### D. FREQUENCY SELECTION

Three switches control the frequency selection. The 100 KHz steps are controlled by the center knob and the 10 KHz steps are controlled by the right hand knob. The left hand knob controls both, 1 MHz steps and 5 KHz steps. There are two positions for each MHz setting, one which will give a 0 in the KHz display and one which will show 5 KHz.

### E. RECEIVER

The antenna is coupled into a 3 section low pass filter which reduces unwanted signals from commercial transmitters and other stations. The tuned RF amplifier incorporates a FET for maximum signal to noise characteristics and feeds the signal to a dual gate mosfet mixer. The resultant 21.4 IF is connected to an 8 pole crystal filter with extremely sharp selectivity. The signal is amplified and then detected by a 2 pole crystal discriminator. The final audio amplifier develops 4 watts of output. See block diagram for signal path.

### F. R.F. POWER MODULE

A L.S.I. 25 watt rf power module delivers a clean signal to the 3 section filter. This module requires no tuning and is designed for ruggedness and durability.

### G. VARIABLE TRANSMIT POWER

Output power may be varied between approximately 1 watt through 25 watts from the front panel. When communicating with nearby stations, the lower power output setting may be used to minimize interference to other stations.

### H. SOLID STATE CONSTRUCTION

No relays are used, resulting in lower maintenance.

### I. TOUCH TONE CONNECTION

There is a prewired plug on the back of the set which will take the AMCOMM touch tone pad.

### J. CONSTRUCTION

The S 2 25 circuitry is designed and constructed on G-10 fiberglass printed circuit board material, for a most reliable foundation. All circuit boards are mounted on chassis standoffs for maximum mechanical stability. The entire mechanical chassis is aluminum, including the cover and front panel for superb durability.

## INSTALLATION:

Upon receipt of your transceiver, carefully examine it for any signs of damage. Should any damage be apparent, notify the delivering carrier or dealer immediately, stating the full extent of the damage. Amcomm recommends that you keep the shipping carton. In the event storage, moving or re-shipment becomes necessary, they come in handy.

For use in mobile applications, locate your transceiver in the most accessible position for safety and driving convenience. Since the S 2 25 is compact, many mobile mounting possibilities present themselves. In general, the mobile mounting bracket will provide you with some guide as to placement. For fixed station use, a 7 Amp., 13.6 volt regulated power supply is necessary for satisfactory operation. In mobile service a 12 volt negative ground source is required.

Some note must be taken, however, to the condition of the vehicle's electrical system. Items such as a low battery, worn generator/alternator, poor voltage regulator, etc., will impair operation of your transceiver. When high noise generation or low voltage occur, these may be traced to vehicle deficiencies within the electrical system. It is *very* important to have the correct regulated voltage present at all times in transmit or receive functions.

### CAUTION:

EXCESSIVE VOLTAGE (ABOVE 15 VOLTS) MAY CAUSE DAMAGE TO YOUR TRANSCEIVER. BE SURE TO CHECK THE SOURCE VOLTAGE AND POLARITY BEFORE PLUGGING IN THE POWER CORD.

Included with your transceiver is a power cable with a fuse and a polarized plug. This plug can only be installed one way. The red wire is (+) positive, the black wire is (—) negative. The most satisfactory installation is to connect these wires directly to the battery terminals. Use at least a 14 gauge wire (observe polarity). This type of mobile installation permits the least amount of noise and transient spikes, sometimes found in automotive accessory wiring. If such an arrangement is not possible; then, connect the red fuse lead from the S 2 25 to a convenient +12 volt lead in the interior of the vehicle. Connect the black lead from the S 2 25 to a convenient ground in the interior of the vehicle. (Any metal frame in the vehicle constitutes a convenient ground.)

Please be certain that if an interior connection is used, that 13.6 volts at 8 amps is available without over-loading the internal electrical system.

When using the S 2 25 in base usage, observe proper wiring polarity to the DC power supply. The DC power supply must be capable of 13.6 volts at 8 amps. regulated to insure reliable base station operation.

**WARNING: DO NOT CONNECT TO UNREGULATED OR POWER SUPPLY WITH LESS THAN 8 AMP. CAPABILITY AS DAMAGE TO POWER OUTPUT MODULE MAY RESULT.**



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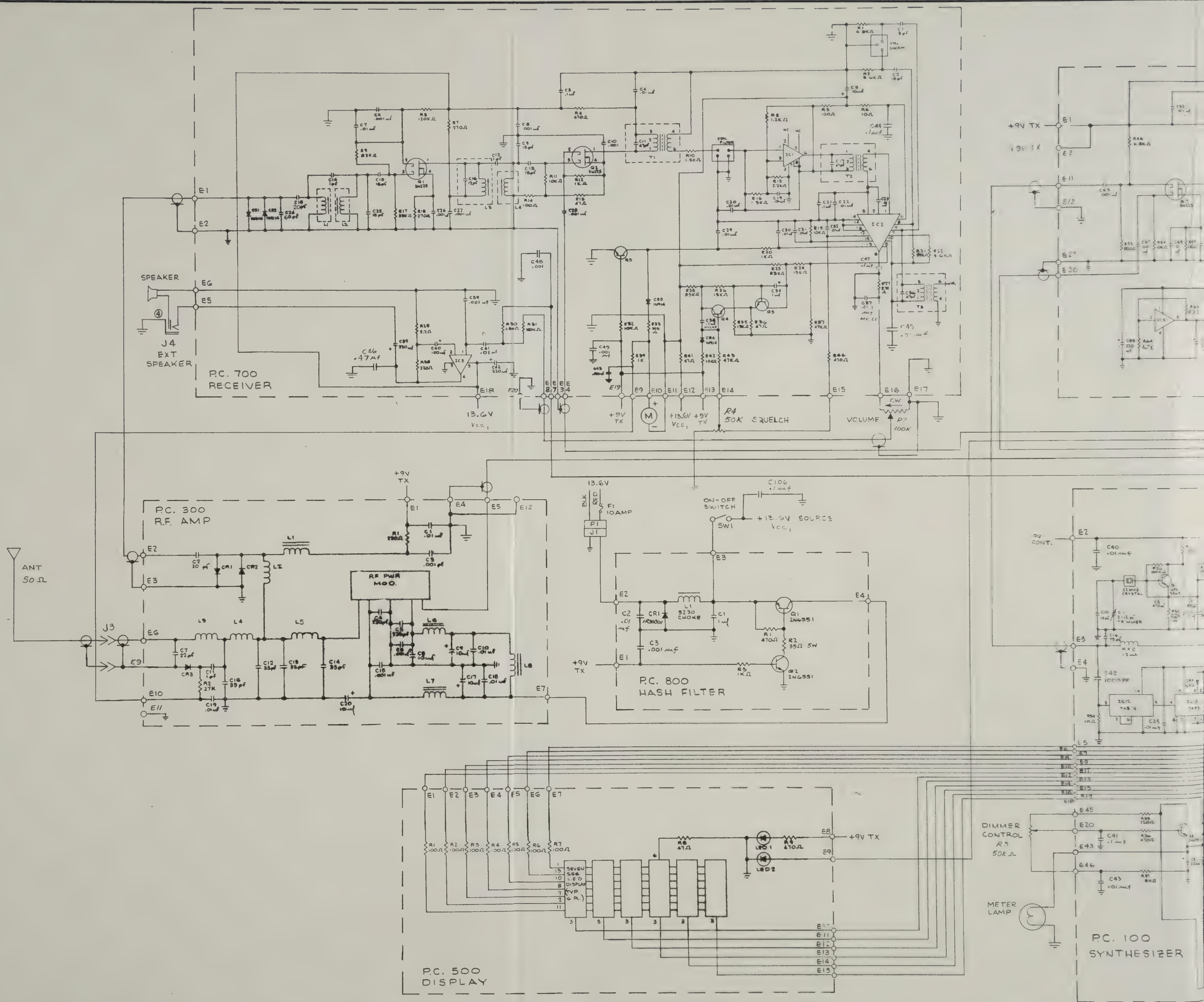
When using the S 2 25 in base usage, observe proper wiring polarity to the DC power supply. The DC power supply must be capable of 13.6 volts at 8 amps. regulated to insure reliable base station operation.

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# AMCOMM

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### Description:

The Amcomm Touch Tone Encoders are designed specifically for use with FM Transceivers to allow telephone access through fixed station repeaters. The encoder generates the standard telephone tones according to the numbered push buttons on the Encoder. The Model TTE-100 is designed specifically for use with the Amcomm S 2 25, 2 meter transceiver, but can also be used on other equipment provided that a +9 volt DC regulated source at 70 ma is available. The Model TTE-200 incorporates its own regulator allowing operation from a +11.0 to +14.0 volt DC source at 70 ma.

Both models provide a switched ground connection for automatic key up of the transmitter when using the touch tone buttons. A delay circuit holds the key up signal for one second after any button is actuated, holding the transmitter on between digits when dialing.

Access to the tone output level control is provided on the back of the unit. This allows adjustment of the deviation of the transmitter according to the user's requirements.

### SPECIFICATIONS

Input Power Requirements	— TTE 100 +9 volts DC regulated at 70 ma TTE 200 +11.0 to +14.0 volts DC at 70 ma
Tone Output Level	— Adjustable to 1.0 volts RMS maximum into 600 ohms
Auto Transmit	— Switched ground with 1 second delay after button release
Size	— 2" x 2¾" x 1" high
Mounting	— Standard microphone button and clip provided
Cable	— 4 wire cable 4' long included for connection to transceiver
Connections	— Green: ground Orange: +9 volts DC for the TTE-100 +11.0 to +14.0 volts DC for the TTE-200 Blue: Remote xmit Purple: Tone output







# AMCOMM

## Touch Tone Encoders — Models TTE-100 and TTE-200

### Description:

The Amcomm Touch Tone Encoders are designed specifically for use with FM Transceivers to allow telephone access through fixed station repeaters. The encoder generates the standard telephone tones according to the numbered push buttons on the Encoder. The Model TTE-100 is designed specifically for use with the Amcomm S 2 25, 2 meter transceiver, but can also be used on other equipment provided that a +9 volt DC regulated source at 70 ma is available. The Model TTE-200 incorporates its own regulator allowing operation from a +11.0 to +14.0 volt DC source at 70 ma.

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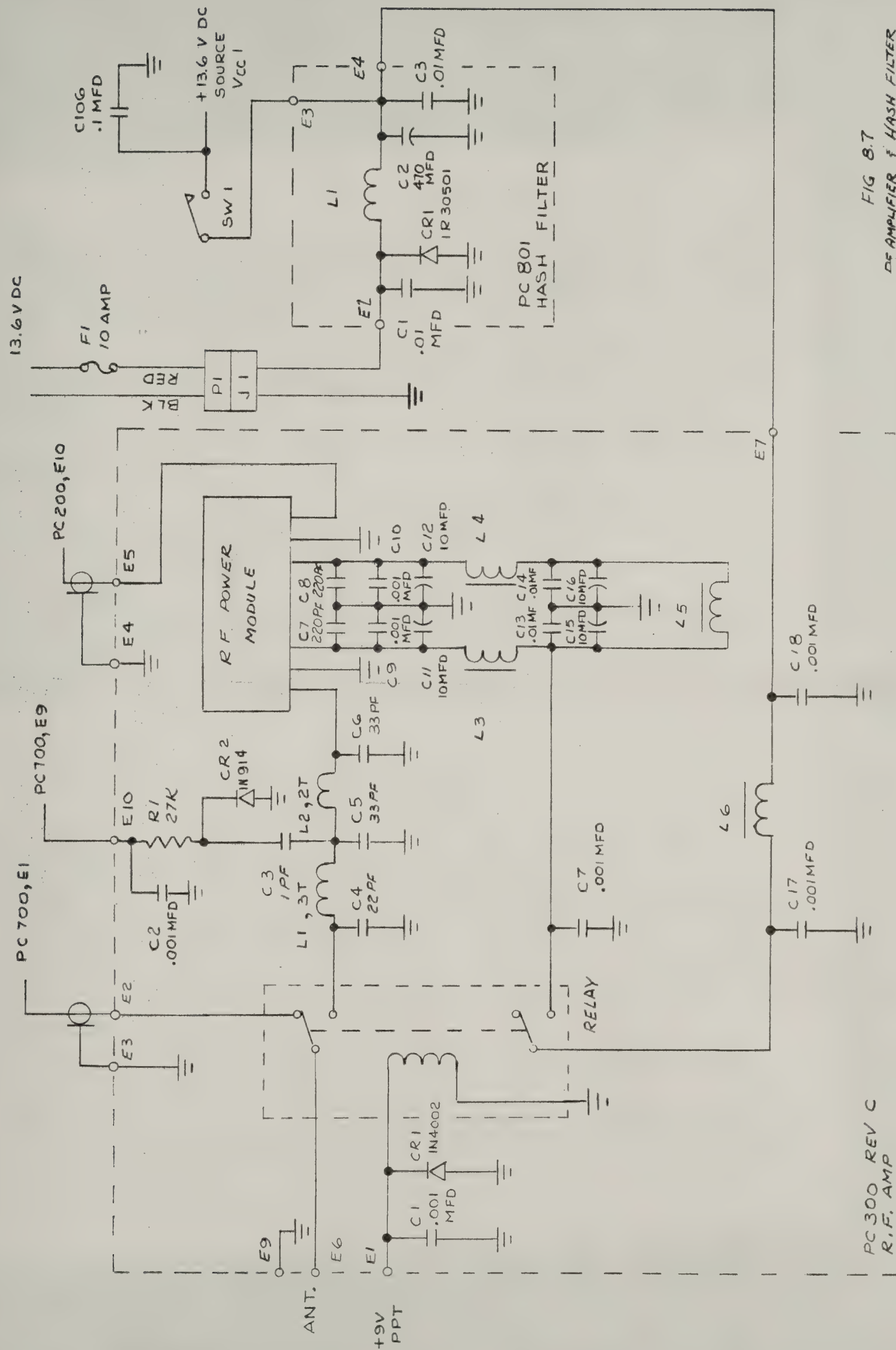
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Auto Transmit	— Switched ground with 1 second delay after button release
Size	— 2" x 2¾" x 1" high
Mounting	— Standard microphone button and clip provided
Cable	— 4 wire cable 4' long included for connection to transceiver
Connections	— Green: ground Orange: +9 volts DC for the TTE-100 +11.0 to +14.0 volts DC for the TTE-200 Blue: Remote xmit Purple: Tone output







PC 300 REV C  
R.F. AMP

FIG 8.7  
RF AMPLIFIER & HASH FILTER  
A3 S-225





## **ANTENNA:**

The most important single item that will enhance the performance of the S 2 25, is the antenna. For that reason, a high quality, high gain antenna of 50 ohms impedance is recommended for either mobile or fixed base station use. DO NOT USE A C.B. ANTENNA FOR ANY REASON. A 27 MHz C.B. ANTENNA APPEARS AS A DEAD SHORT TO A 2 METER (146 MHz) RADIO. THEY MAY LOOK SIMILAR, BUT THEY ARE NOT SIMILAR ELECTRICALLY.

In VHF, as well as the low bands, every watt of EFFECTIVE RADIATED POWER makes some difference. Therefore, 25 watts average output from the S 2 25 plus a 3 db gain antenna equals 50 watts ERP, presuming low VSWR. The few more dollars invested in a high quality gain type antenna will insure reliable communication.

By using a power module in the transmit output stage, a high degree of safety is built-in. There is no tuning and with short circuit protection designed in, you will experience many hours of fine VHF two meter operation.

AMCOMM has included a high quality low impedance microphone (manufactured for us by Turner). The S 2 25 transceiver has been carefully designed and engineered to operate extremely well with this fine microphone. No additional pre-amplification is necessary or desirable.

## **TOUCH TONE PLUG:**

This keyed 6 pin socket is for the S 2 25 TTP. By plugging the tone pad into the socket, you have complete tone generation to access various autopatch equipped repeaters. Autopatch repeaters are only used by members of the local repeater club. Check with your local repeater club to obtain necessary access information.

## **CONTROL FUNCTIONS**

### **1. VOLUME:**

The volume control is used to adjust the audio output. The on/off switch is also on this control.

### **2. POWER:**

This control regulates the transmitter output power from approximately 1 watt to 25 watts. The highest power setting is in the full CW position.

### **3. SQUELCH:**

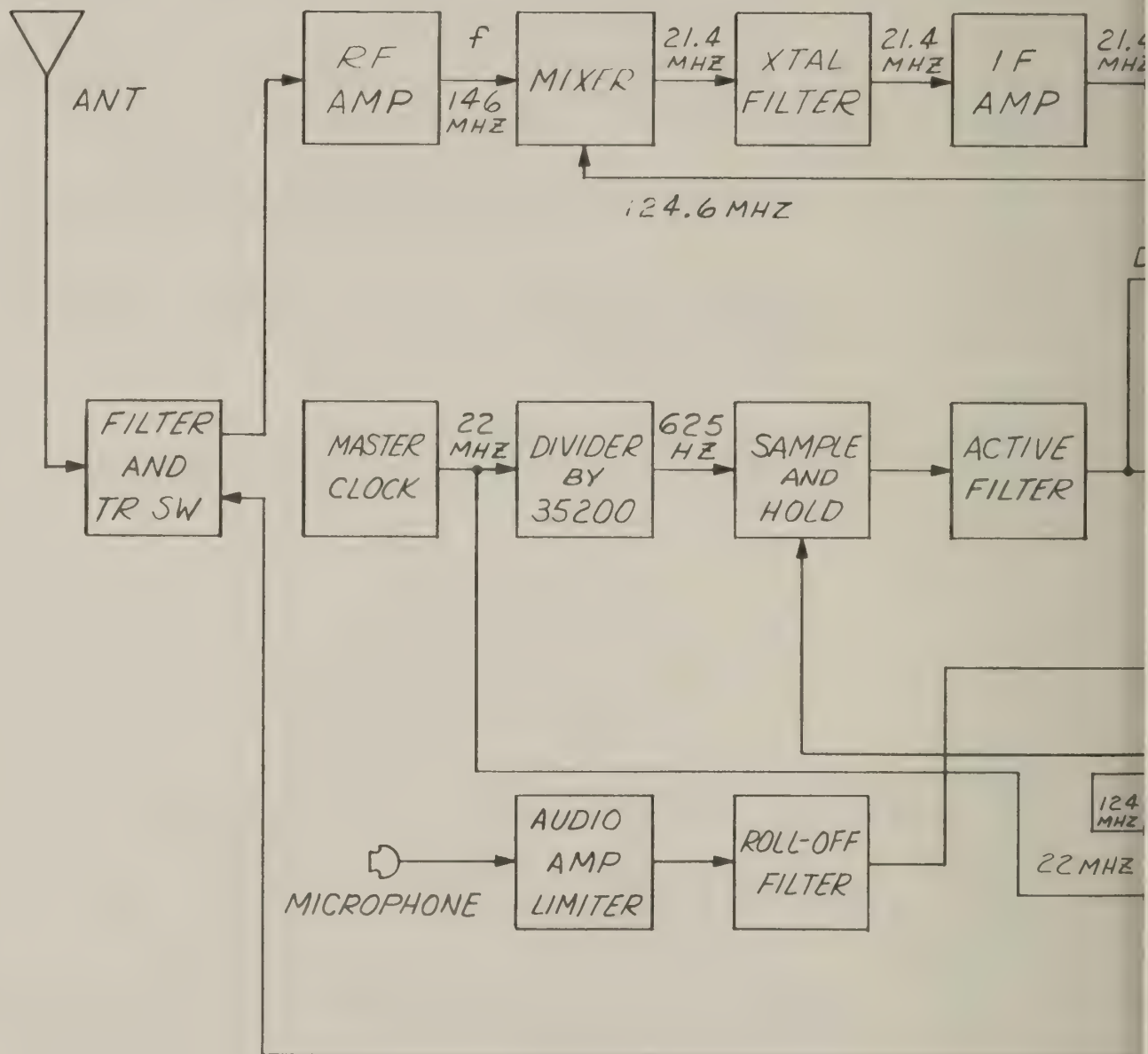
The squelch control is used to remove the background noise when no signal is present. CW rotation increases the necessary signal strength to open the squelch.

### **4. DIM:**

Rotation of this control CW increases the brightness of the frequency display and the meter light.

### **5. MODE:**

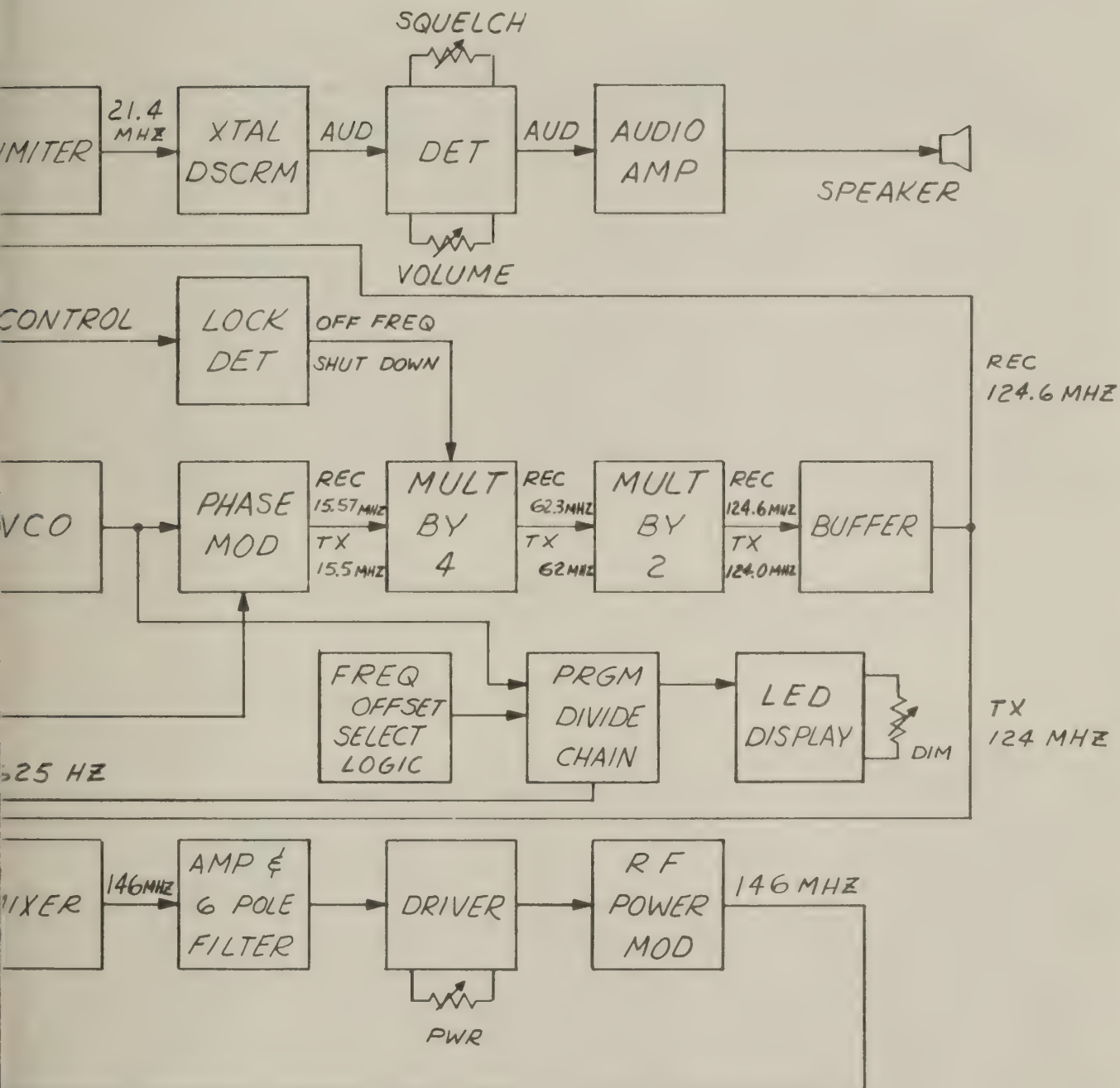
This switch controls the offset of the receiver frequency from the transmitter frequency. The numbers around the control are in MHz with the "S" representing simplex (transmitter and receiver on the same frequency).



NOTE

EXAMPLE FREQ: 146 MHz ON SIMPLEX OPERATION





AMCOMM			
730 W. Mc NAB RD., FT. LAUD., FLA			
SCALE:	APPROVED BY:	DRAWN BY HUBERT	
DATE: DEC 76		REVISED	
2 METER TRANSCEIVER			
MODEL S 2 25			DRAWING NUMBER C1055H

**6. FREQUENCY CONTROLS: (3 Knobs):**

These controls set the operating frequency of the transmitter.

6A. The first control regulates the MHz position (144, 145, 146 and 147) and the KHz position (0 KHz, 5 KHz). There are two positions for each MHz setting, one which will show 5 KHz and the other will show 0 KHz.

6B. The next control sets the 100 KHz setting (0-900 KHz).

6C. The last control sets the 10 KHz setting (0-90 KHz).

**7. FREQUENCY DISPLAY:**

This display shows the transmitter frequency in MHz and is changed by the three frequency control knobs. The receiver frequency is this frequency plus or minus the value set by the mode switch.

**8. LOCK LIGHT:**

This light is located at the extreme right of the frequency display window and is denoted by the word "LC". When it is lit, the synthesizer is locked on to the desired frequency and is stable. When changing frequency between transmit and receive, the light may blink showing that the synthesizer has moved to the new frequency.

**9. TRANSMIT LIGHT:**

This light is located at the extreme right of the frequency display window and is denoted by the word "TX". It lights when the transmitter is turned on and shows that a signal is being transmitted.

**10. METER:**

On receive, the meter shows the incoming signal strength. On transmit, it shows the transmitted power.

**11. MIKE CONNECTOR:**

The microphone supplied with the set is attached here. The set is designed to use a 2000 ohm ceramic mike.

**12. EXTERNAL SPEAKER JACK:**

This jack is used when an external speaker is desired. Use of an external speaker automatically disconnects the internal speaker.

**13. TOUCH TONE PAD:**

The optional touch tone pad may be connected here. The terminals are: 1, ground; 2, N.C.; 3, +10 volts; 4, push to talk; 5, N.C.; 6, audio.

**14. POWER PLUG:**

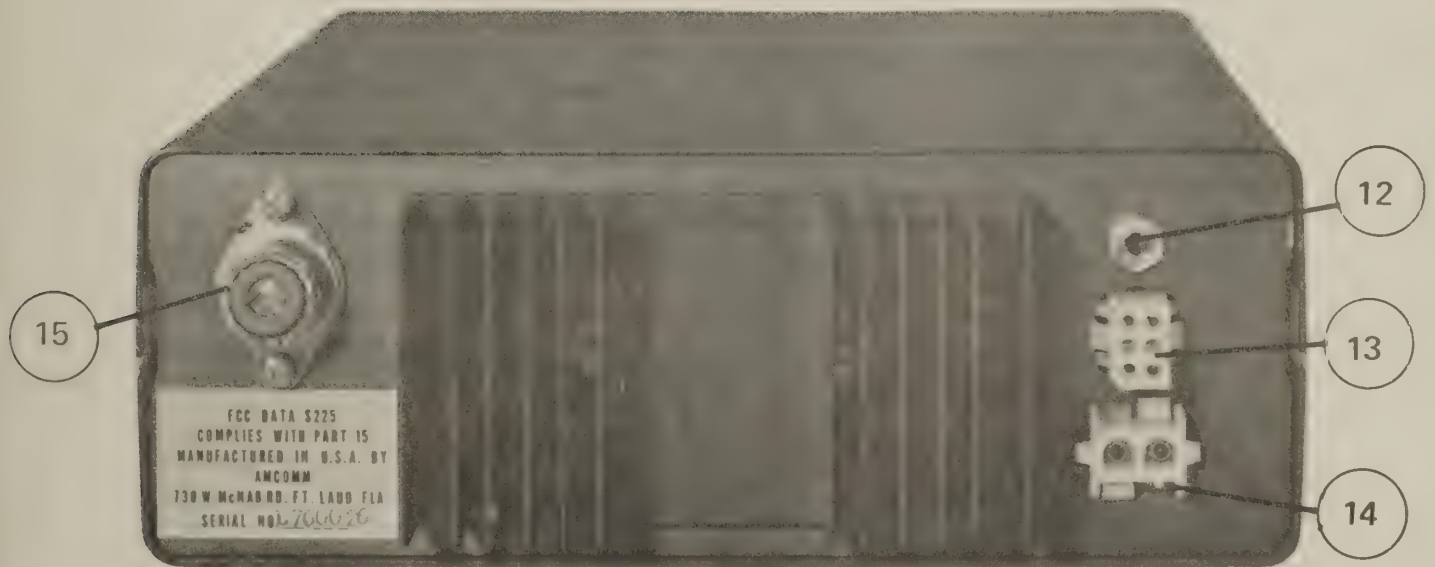
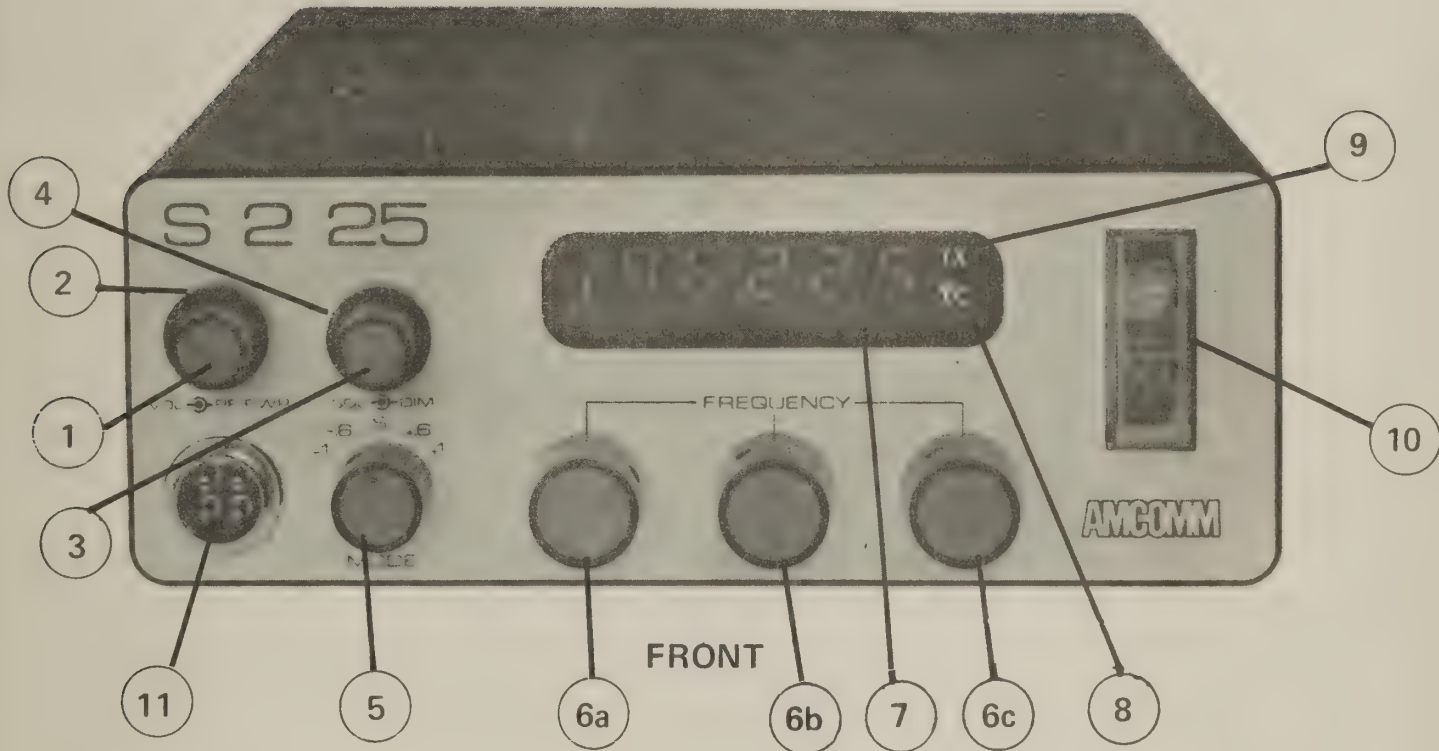
The power plug is polarized to prevent damage to the S 2 25 after the power cable has been correctly connected to the voltage source. (See section "Installation")

**15. ANTENNA:**

The antenna connector requires a PL 259.

A 50 ohm 2 meter antenna is connected here.

# S 2 25 CONTROLS



REAR



## THEORY OF OPERATION

The S 2 25 Transceiver incorporates state of the art integrated circuitry to insure maximum reliability and years of trouble free service. The heart of the unit is a single crystal controlled synthesizer which assures maximum frequency stability on both receive and transmit. The receiver uses a standard single conversion superheterodyne design and crystal filtering for optimum selectivity and sensitivity. The transmitter features a solid state power output module pretuned to the 2 meter band.

The transmitter is energized by the "Push to Talk" button on the microphone. The audio from the microphone is processed, filtered, amplified and applied to the phase modulator which varies the frequency from the VCO and generates the frequency modulated output signal.

When transmitting at 146 MHz the VCO operates at 15.5 MHz and is locked on frequency by the synthesizer. The VCO output is multiplied 8 times to 124 MHz and mixed with the crystal frequency of 22 MHz to produce the operating frequency of 146 MHz. The signal is amplified and filtered by the 6 pole broad band amplifier and drives the power module to full power output. The output signal passes through the low pass filter to attenuate the spurious and harmonic energy and is then radiated by the antenna.

In the receiver the signal path from the antenna to the loud speaker is as follows. With the receiver tuned to 146 MHz the signal is captured by the antenna, fed through the low pass filter, amplified by the band pass R.F. amplifier and mixed with the local oscillator at 124.6 MHz to produce the I.F. frequency of 21.4 MHz. The I.F. signal is filtered through an 8 pole monolithic crystal filter for optimum selectivity. The I.F. signal is then amplified, limited and passed through a crystal quadrature detector. The resulting audio is fed through a squelch circuit, audio preamplifier, audio power amplifier and then to the loud speaker. An "S" meter is provided for relative signal strength.

A unique, advanced design, single crystal controlled synthesizer is used for all frequency control functions, producing in 5 KHz increments the transmitter exciting frequency and the receiver local oscillator signal when in simplex operation. For duplex operation, and depending upon the setting of the Mode Switch, the synthesizer produces the necessary offsets in local oscillator frequency to allow reception at either  $\pm 600$  KHz or  $\pm 1$  MHz from the transmitted frequency.

The master clock crystal oscillator at 22 MHz is divided by 35,200 to produce a 625 Hz reference frequency. The programmable divide chain controlled by the frequency offset and frequency select logic divides the frequency from the voltage controlled oscillator. This is compared in the sample and hold circuit and a control voltage is generated. This control voltage keeps the VCO on the proper frequency. A lock detector is provided for off frequency shut down.

The VCO output is fed into the multipliers where the frequency is multiplied by 8. The result is used by the receiver as the local oscillator frequency or is combined with the 22 MHz clock to provide the transmitter frequency.

## **ALIGNMENT**

The S 2 25 is a complex broad band transceiver. Except for transmitter deviation, **NO ADJUSTMENTS SHOULD BE MADE WITHOUT PROPER EQUIPMENT AND KNOWLEDGE.** Due to the broad band design, any improper adjustment of the multiplier or R.F. predriver will result in desensitizing the receiver, "birdies", or unwanted harmonics. The only way to properly align the radio incorporates the use of a spectrum analyzer.

The S 2 25 is factory adjusted for a deviation of  $\pm 5$  KHz at 100% modulation which is compatible with most amateur repeater stations. The thumbwheel control to adjust deviation is located approximately in the center of the printed circuit board (PC-200) nearest the front panel on the top side of the chassis. Turning the control clockwise when viewing the radio from the front decreases the deviation; conversely, turning it counterclockwise increases the deviation. Access to this control is gained by removing the two #4 screws on each side of the unit and the top cover.

If further information is desired on maintenance and alignment of the radio, please write to the factory:

**AMCOMM**

730 West McNab Road

Fort Lauderdale, Florida 33309









730 WEST McNAB FORT LAUDERDALE, FLORIDA 33309

